

and reagents which the microscopist should have at his command, as well as of the mode of examination of microscopic objects. In the second department the editor has been again assisted by the Rev. M. J. Berkeley in the cryptogamic articles, and by Prof. Rupert Jones in those on Geology and on Foraminifera, as well as by other specialists. To put new wine into old wine-skins is proverbially an unsatisfactory proceeding ; and we do not know that it has been more successful here than elsewhere. We are far from saying that the syndicate who have assisted the editor have not contributed much from their vast stores to bring down the work to the date which it now bears on its title-page ; but in some of the articles which we have had occasion to consult for work that we have happened to have in hand, the most recent observations are certainly not alluded to, and the system of classification is not the best or newest. But granting these defects, the work is one which no practical microscopist can afford to be without, and which must always lie on his table for ready reference. The present edition is enriched by five new plates, and some new woodcuts.

A. W. B

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Speke and Grant's Zebra

IN or about 1882 a zebra was presented to the French Government by King Menelik of Shoa (which is in lat. 10° N., south-east of Abyssinia). It differed in certain respects from zebras hitherto supposed to have been described, and being regarded therefore as a new species or variety was named by Mr. Milne Edwards *Equus Grevyi*, after the President of the French Republic.

The species of zebra hitherto known were *E. quagga*, *E. Burchelli*, and *E. zebra*. The new one recently received in Paris apparently approximates to *E. zebra*, but the arrangement of the stripes, which are more numerous and more closely set, especially on the haunches, as well as its geographical distribution, seem to give sufficiently distinctive characters to entitle it to rank as a new species or variety.¹

In a recent communication to the Zoological Society of London, Col. A. Grant, C.B., F.R.S., has called attention to the fact that the late Capt. Speke and he observed, hunted, and shot zebras during their expedition (chiefly in the lake regions of Equatorial Africa) in 1860-63, which from his description are either identical with the zebra from Shoa, or, if not, are entitled to be considered as a new species or variety.

Col. Grant has described the animal both in his notes written during the expedition and also in a paper to the Geographical Society in 1872, of which extracts are subjoined.

Should further examination and comparison show that the zebra described by Grant in 1861, and again in 1872, is identical with the Paris animal, it would seem that priority of discovery, although hitherto unclaimed, is due in title, as it is in fact, to Speke and Grant. If, on the other hand, the animal described by them should turn out to be distinct from any other form yet described, it would appear to have a claim to be named after these discoverers.²

The following extracts from Col. Grant's notes and papers addressed to the Geographical Society—written many years ago—appear to substantiate Speke and Grant's claim to the discovery and description of a new variety of zebra :—

¹ It should be added that *E. Burchelli* is the only zebra known to occur north of the equator, and that *E. zebra* has not been seen for many years. (Refer to figure in *Proc. Zool. Soc.* 1882, iv. p. 721, published April 1, 1883.)

² It is possible that it may be a local variety of *E. zebra*, hitherto found much further south.

Speke and Grant's Expedition of 1860-63, from *Journal of Royal Geographical Society of London*, 1872

" *Equus zebra* (?), Native name 'Phoonda.'—This animal was frequent in Ugogo, Unyamezi, and north of Uganda. He differs from the *Equus Burchelli* of Regent's Park Gardens in being larger and differently striped. The stripes of our zebra were black upon white (not yellow) ground, and extended to the hoofs, whereas *Burchelli* has broader stripes, yellow ground, and the stripes on the legs are few. However, a sketch of an old mare shot by me shows the same black muzzle and hog mane as *Burchelli*, and Mr. Blyth says my sketch is of this last species."¹

From Notes of Expedition

" Oct. 25, 1860.—Zebra shot through chest, shape superb, scarcely any pile, thickly striped over every inch of it, feet, legs, and all ; fine hoofs, immense intestines. Flesh had quite the look of prime beef, ears rounded like deer's ; a mare. A second zebra brought in by Ruyter. This was at Zungomero.

" Dec. 18.—Halt, in lat. $6^{\circ} 22'$ S., long. $30^{\circ} 50'$ E., altitude 2500 feet to 3329 feet. Zebra spoor again. . . . Shot another zebra.

" Dec. 21.—Again got zebras ! . . .

" Dec. 22.—Do. do. . . .

" Jan. 2, 1861.—Eight to ten zebras.

" Jan. 6.—Zebras came among camp donkeys." . . .

Recent Note by Col. Grant, C.B., F.R.S.

" When we were shooting these zebras in Africa, we thought we were shooting the zebra which is common to Africa ; but after our return, on my seeing Burchell's at the Zoological Gardens, I felt convinced we had never seen a Burchell's zebra ; I said so to Blyth, who looked at my sketch, but who never saw Speke's specimens, and he seems to have called our zebras *Burchelli*. As soon as I saw Speke's specimens in 1873, and on hearing Prof. Flower describe by drawings the various zebras, I brought forward the matter, and got Speke's specimens up from Speke's brother. My journal notices the stripes to be an inch apart all over the body, and extended to the hoofs ; but it says nothing of the marks on the haunches, though I believe that in our zebras, as well as in all other species, the haunch stripes are farther than an inch apart."

" The twelve zebras which were shot by the Speke and Grant expedition in 1861-3, were found at the undermentioned places in Africa :—

Places.	Lat.	Long.	Alt. above Sea. Feet.
Zungomero	$7^{\circ} 27' S.$	$37^{\circ} 36' E.$	516
Jiwe la M'ko'a	$6^{\circ} 0' S.$	$34^{\circ} 0' E.$	4690
Rubuga	$5^{\circ} 0' S.$	$33^{\circ} 0' E.$	3492
Usui District	$2^{\circ} 49' S.$	$32^{\circ} 0' E.$	About 4000
Uganda District	$0^{\circ} 52' N.$	$32^{\circ} 30' E.$	About 4000

" The zebras pasture in the forest and also in open country which is covered with bushy jungle, or where granite crops up, as this bears the richest grass, whilst hills with running water are always within their access."

However the zebras in question may be named, it seems right that the facts connected with Speke and Grant's discovery should be known.

J. FAYRER

April 17

Leaves and their Environment

I AM taking steps to have some analyses instituted, by a highly qualified authority, of the atmosphere (or water) in the natural environment of certain typical plants, in order, if possible, to produce experimental evidence upon the points impugned by Prof. Thiselton Dyer. The results of such (necessarily very inconclusive) evidence I shall publish in NATURE, if the Editor will grant me space, whether they are favourable or otherwise to my own allegations.

Meanwhile, as Prof. Dyer has himself relied upon purely *a priori* considerations, may I urge (1) that in the papers themselves I did not overlook the other factors of the problem to which he alludes ; (2) that in woods, hedgerows, and thickets, the air is generally very still ; (3) that the layer of air from time to time in actual contact with the surface of plants must always be in course of being deprived of its carbonic acid ; and (4) that

¹ Evidently Blyth was mistaken, as the zebra was thickly striped on the legs, which is not the case with *E. Burchelli*.

wherever plants get free access to the open air above, it was one of my own assertions that they must necessarily obtain carbonic acid in abundance. It seems to me difficult to understand how in a still place, where many plants at once are engaged in deoxygenising a compound which only normally forms 0.03 per cent. of the atmosphere, there can always be as much of it left as any of them can possibly want. I do not presume to argue with Prof. Dyer upon the subject; but as far as my own comprehension goes, he has not made this point clear to me.

May I venture also to suggest that perhaps another danger surrounds biology, and especially botany—the danger of becoming too technical and too academic? Now that perfect instruments, immense collections, and a long technical training are necessary in order to do anything in biology by the regular road, does not the science run just a little risk of falling into a groove? And is it not well from this point of view that there should be an outside body of amateurs, who will take occasionally a fresh non professional view of the subject, handling their own problems in their own way, and publishing their own little guesses or glimpses for what they may be worth? No doubt they will often go demonstrably wrong; no doubt the masters of the science will usually find numerous blunders of detail in their work, and may often see reason to disagree with them altogether; and in that case the amateurs ought to receive their corrections with all humility; but is it not a healthy thing after all that the amateurs should do their best, and try to follow out their own lights to their own conclusions? GRANT ALLEN

Forms of Leaves

YOU have recently inserted several letters from Mr. Grant Allen on the forms of leaves, a question in which I have myself been working lately. Mr. Grant Allen's letters open up a number of interesting questions, but for the moment I will only refer to his suggestion with reference to the reason why water plants so often have their leaves cut up into fine filaments. He tells us that this is because the proportion of carbonic acid held in solution by water is very small, and that therefore for this amount there is a great competition among the various aquatic plants.

The question has already been asked on what grounds Mr. Allen makes this statement with reference to the proportionate amount of carbonic acid. Without entering on this point, I would, however, venture to suggest that the reason for this tendency in the leaves of water plants is mechanical rather than chemical.

It is, of course, important for all leaves to present a large surface for the purposes of absorption with as little expenditure of material for purposes of support as possible. Now delicate filaments such as those of water plants present a very large area of surface in proportion to their mass. On the other hand, they are unsuited to terrestrial plants, because they are deficient in strength and unable to support themselves in air. Take, for instance, a handful of the submerged leaves of an aquatic ranunculus out of the water, and, as every one knows, the filaments collapse. This seems to me the real reason why this form of leaves is an advantage to water plants. It is perhaps for the same reason that low-growing herbs, which are thus protected from the wind so often have much divided leaves.

April

JOHN LUBBOCK

The Föhn

MAY I be allowed the space of a few lines to point out a defect in the account of the Föhn, given by Mr. Scott in his recent work on "Meteorology," and quoted in the review of that work which appeared in NATURE, vol. xxvii. p. 575. This phenomenon has been fully and clearly explained by Dr. J. Hann in a paper entitled "Einführung in die Meteorologie der Alpen," published under the auspices of the D. und O. Alpenverein. Mr. Scott's account of the Föhn attributes rightly the dryness and the cooling of the wind at high altitudes to expansion; but he appears to entirely overlook the heating effect due to condensation of moisture during the ascent of the wind.

From observations made in Switzerland, where the Föhn is chiefly felt, Hann has established the following rule: the Föhn is as many half degrees C. warmer at any place in its descent, than it is at an equal altitude during its previous ascent on the other side, as the place is hundreds of metres below the mountain ridge. This he explains by the fact that compression during the descent of the Föhn reverses the loss of temperature due to rare-

faction during its previous ascent; while the wind brings with it over the mountain ridge the heat gained by the liberation of latent heat in the condensation of moisture. This latter amounts at 15° C. to about half a degree C. for each ascent of 100 metres for saturated air. "Therein," says Hann, "lies the explanation of the heat of the Föhn."

A. IRVING

Wellington College, Berks, April 21

The Zodiacal Light (?)

THE same "peculiar appearance in the western sky" as that described by your correspondent, "J. W. B." was observed here by me on the same evening, April 6. At 7h. om. G.M.T., or fifteen minutes after sunset, I noticed a bright, golden-coloured column of light, well defined, about 4° in length and slightly more than 1° in width, and inclined towards the south. "J. W. B." says it "rose vertically from near the horizon" at his station, Bath. Here it was decidedly inclined to an angle of about 15° towards the south. At 7h. 20m. no traces of it were visible. I have not seen any similar appearance since.

W. H. ROBINSON

N.B.—In the observer's book this observation is entered as "Bright zodiacal light (?), seen at 7h. om." E. J. STONE Radcliffe Observatory, Oxford, April 20

REFERRING to the letter of your correspondent, "J. W. B." Bath, in your last issue (p. 580), allow me to say that this peculiar ray of brilliant light was seen here by myself and many other people at about 6.40 p.m. on Friday, April 6. The sunset was brilliant and cloudless, but from the horizon to about 25° in height immediately above the spot where the sun had disappeared there appeared a ray of light of great beauty and extreme brilliancy; its centre, a delicate rose colour, graduating to the edges into the purest gold. This single ray was perpendicular, and appeared to be little, if at all affected, in its brilliancy by the approaching dusk of evening, but continued to exhibit itself with little-diminished brilliancy for nearly half an hour, finally disappearing with the twilight.

ROBERT DWARRIS GIBNEY

Glan-y-dwr, Crickhowell, South Wales, April 21

WHAT your correspondent, "J. W. B." saw after sunset was not the zodiacal light, which is easily distinguishable by its great extent of area, lenticular shape, and invisibility during strong twilight, but it may be not incorrectly termed a sun column. I find the following entry in an old journal, of a similar appearance:—"1868, April 17.—Sun column, continuing half an hour after sunset, which was perfectly bright, without clouds." Perhaps some of your readers may be able to explain the cause of it.

E. BROWN

Further Barton, Cirencester, April 21

THE phenomenon observed on the evening of Friday, the 6th inst., in Bath, by your correspondent J. W. B. (vol. xxvii. p. 580) was seen at Dolgelly by the writer when on a tour through Wales. On his pointing it out to a companion and some of the townsfolk, all agreed it was quite unique in their experience.

A bright, slender pillar of light, hazy toward the edges, rose majestically from the western horizon, in a cloudless sky, and so continued for about three-quarters of an hour after the sun had set. To one long habituated in meteorological observation it was of a character differing *toto caelo* from the path of sunbeams through a cloud-rift, which is invariably divergent in appearance, as if from a focus. The "pillar" was uniform in width, perfectly vertical, and straight, the centre line alone brilliant. The height was, however, greater than your correspondent indicates.

Having fortunately with me a pocket-compass, with plumb-bob for "dip" measurements, I determined (1) the light-pillar was exactly vertical; (2) the height, which scarcely varied during visibility, was 20°, dying out faintly at that elevation; (3) the azimuth 25° north of west. By terrestrial bearings there was an appearance or a slight movement northward, but smallness of the compass dial (1 inch diameter) precluded any reliable angular determination of azimuthal change.

Further, the evening was very cold, and a continuous easterly wind had during the day obscured the hills, which still showed many unmelted snowdrifts upon their summits and flanks. First observed at 7 p.m., the strange appearance faded out at 7.30 p.m.